

U.S. Department of Agriculture Report to the Invasive Species Advisory Council for their spring 2012 meeting

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A. USDA Progress on ISAC recommendations from the October 2003 meeting

- 1. ISAC recommendation: Increase efforts in economic analysis to make the case for investments in invasive species efforts.**

The Economic Research Service (ERS) is continuing the “Program of Research on the Economics of Invasive Species Management” (PREISM) initiated in FY 2003. PREISM supports economic research and the development of decision support tools that have direct implications for USDA policies and programs for protection from, control/management of, regulation concerning, or trade policy relating to invasive species. Program priorities are selected through extensive consultation with APHIS, OBPA and other agencies with responsibility for program management.

For example, ERS developed a pest-ranking decision tool for APHIS to determine which pests would be on its 2004 and 2005 Federal-State Cooperative Agricultural Pest Survey (CAPS) list, making transparent the basis for selecting the pests for which State cooperators could receive targeted pest surveillance and detections funds. Also, the rapid spread of soybean rust in South America prompted ERS, in April 2004, to publish a study of the economic and policy impacts of its windborne entry into the United States. USDA used the ERS analysis in refining rapid response strategies when APHIS confirmed the presence of soybean rust on November 10, 2004 in Louisiana. ERS extended this work to examine the value to

producers of USDA's coordinated framework to detect and report the presence of Asian soybean rust in different producing areas and released a report in 2006.

In addition to ERS-led analyses of invasive species issues, PREISM allocated about \$6.8 million in extramural research cooperative agreements through a peer-reviewed competitive process in FY 2003-08. About \$1.1 million per year were allocated for extramural agreements in FY 2005 and FY 2006; \$950,000 was allocated in FY 2007 and \$970,000 in FY 2008. **No funds have been allocated since FY09. The last extramural research projects should be completed during FY13.**

PREISM-funded researchers are addressing important issues. For example, a Virginia Polytechnic Institute and State University research team collaborated with APHIS staff to analyze a rule to allow importation of avocados from Mexico, using a framework developed under a PREISM-funded agreement. The framework and economic analysis were published in the Federal Register with the APHIS rule. PREISM-funded researchers, as part of their projects, are collaborating with agencies to address invasive species issues and decisions, such as the coordination of prevention and control strategies for Brown Tree Snakes and *Miconia calvescens* in Hawaii, management of cheat grass, management of diseases transmitted between livestock and wildlife, insect resistance management in strawberry production, responses to outbreaks of foreign animal diseases, and prioritizing invasive plant management by public agencies. At the invitation of the Council on Food, Agricultural, and Resource Economics (C-Fare) and the Weed Science Society of America (WSSA), Muniswamy Gopinath (Oregon State U.) and Bruce Maxwell (Montana State U.) briefed congressional staff about their PREISM-funded projects on May 5, 2006.

ERS organized 8 workshops from 2003 to 2011 to provide forums for dialogue on economic issues associated with agricultural invasive species.

Following are some preliminary findings from PREISM-funded research projects:

- Prevention and management resources should be allocated to species and strategies with the highest return (in terms of damage reduction over time). Ideally, marginal benefits and costs should be equal across species and strategies.
- Decision-support tools that follow sound economic principles and reveal underlying scientific assumptions and value judgments provide a basis for expert and stakeholder involvement in decision-making and promote efficient allocations of funds.
- Optimal invasive species management strategies depend upon the stage of the invasion and associated rates of growth and spread. Eradication may be optimal for small invasions; reduction to a containment level for larger invasions. If eradication is feasible, the effort will reduce discounted damages more if it occurs early when populations are small. Delays result in more damages. If total cost increases rapidly as population increases, eradication when the population is small followed by prevention may be the best strategy.
- Under-funded eradication or management efforts can be cost-ineffective or wasteful, with little or no effect on invasive species growth and total damage. Higher initial expenditures can reduce long term damages and control costs, even if the species is not eradicated.
- For established invasive species infestations, per unit costs of removal can increase as populations decrease or become more isolated, making complete eradication difficult or cost-inefficient. In some cases, accommodation to low levels of invasion is economically preferable to the high cost of eradication. The higher is the cost of removal, the larger the residual population that will remain which will need increased surveillance and continual management.

- Higher invasive species infestation or population growth rates reduce benefit-cost ratios of control efforts, and at high enough rates, control might not be worthwhile. If population has surpassed that of maximum growth rate, the best strategy could be a pulse-like effort that drives populations below a critical population level and growth rate, followed by containment strategy.
- Probability of occurrence maps for invasive weeds based on GIS and other inventory or survey data and related population growth rates can improve weed management efficiency by reducing: 1) costs by targeting sites to monitor invasiveness, and/or 2) damage by initiating control of highly invasive populations before they spread.

Coordination of regulations across U.S.-Canada, State, and provincial boundaries could: 1) more effectively reduce the cross-border spread of exotic horticultural plants that become invasive, and 2) reduce incentives for cross-border firm relocations to take advantage of more lenient regulations.

Ecological and agronomic differences influence cross-State differences in noxious weed and weed-seed lists, but stakeholder lobbying also has significant effects.

Important PREISM outputs and accomplishments are documented in the 2003-2011 PREISM activities report (<http://www.ers.usda.gov/publications/AP/AP056/>).

Beginning in 2007, **NIFA's** National Research Initiative (NRI) Program, Biology of Weedy and Invasive Species in Agro ecosystems, has required an economic component in the integrated projects it funds. Specifically, the focus of such programs is the development, delivery, and implementation of ecologically-based, invasive species management programs (e.g. use of cover crops, grazing, tillage, and biocontrol agents) that include economic decision support tools to evaluate tradeoffs of different management strategies. A total of \$4 million was awarded such projects. This priority was continued in the Agricultural and Food Research Initiative

(AFRI) grants program in FY09 with an additional priority focusing on the abundance of weedy and invasive species and the individual and/or collective impacts of these species on a broad suite of ecosystem services, both market and non-market, and that can be used to evaluate tradeoffs of different management strategies. Although the Biology of Weedy and Invasive Species in Agro ecosystems Program was discontinued in AFRI in FY2010, a new grant program was offered through the AFRI Foundation Program for FY2011 entitled “Controlling Weedy and Invasive Plants” with an emphasis on herbicide resistance management. It is anticipated that this program will continue in FY12.

USFS researchers participated in a study that identified the key pathways for forest pest introductions as wood and wood products (especially common for wood boring insects, e.g. EAB) and live plant imports (the most common pathway for all other types of insect pests and pathogens. The study was funded by The Nature Conservancy, through the University of California at Santa Barbara’s National Center for Environmental Analysis and Synthesis.

Incoming plant shipments are inspected for pests, but researchers estimate that because of the vast workload, about 72 percent of infested plant shipments passed through United States ports undetected in fiscal year 2009. This finding highlights the importance of the recent adoption of the NAPPRA category, and a targeted inspection system. It further demonstrates the importance of implementing the integrated systems approach called for in NAPPO RSPM-24 and the new international standard for plants for planting.

At least 455 species of non-indigenous forest insects and diseases have established in the United States. The study identified 82 “high impact” insects or diseases that had caused significant damage to forests and determined the most likely pathway by which their invasion occurred. For these damaging non-native forest pests, approximately 69 percent can be attributed to the live plant trade. The study was published April 1, 2012. Liebhold, A.M., Brockerhoff, E.G., Garrett, L.J., Parke, J.L., and Britton, K.O. 2012 Live plant imports: the major pathway for forest insect and pathogen invasions of the US. *Frontiers Ecol Environ* 2012; doi:10.1890/110198

B. USDA progress on ISAC recommendations from the March 2004 meeting

2. ISAC recommendation: What are NISC agencies doing to avoid harm?

USDA has eight agencies included in its invasive species portfolio: Forest Service (FS), Natural Resources Conservation Service (NRCS), Animal and Plant Health Inspection Service (APHIS), Agricultural Research Service (ARS), Economic Research Service (ERS), Foreign Agricultural Service (FAS), Farm Service Agency (FSA), and National Institute of Food and Agriculture (NIFA, formerly CSREES, the Cooperative State Research, Education and Extension Service).

Securing input from the USDA agencies, the USDA Senior Invasive Species Coordinator created the USDA DO NO HARM REPORT, a report to ISAC and NISC, by fiscal year, including 3 categories of activities:

- a) Invasive Species Program activities USDA agencies are carrying out to do no harm;
- b) The way in which, when they do carry out other agency programs activities, they are also designed to do no harm; and
- c) A list of activities that ARE doing harm and the future actions the agency will take to change the activities so that they do no harm.

Within the above categories, agencies include their own activities as well as activities that are coordinated with other Federal agencies, per the mandate under the Invasive Species Executive Order.

The following Do No Harm reports have been presented to ISAC (meeting date in parenthesis):

- FY04 report NRCS, APHIS, ARS, CSREES & ERS (Oct. 04)
- FY04 report for US Forest Service (Feb. 05)
- FY05 report for NRCS, APHIS, CSREES, ERS & FS (Oct. 05)
- FY05 report for ARS (April 06)
- FY 06 report for FS, NRCS, CSREES & ERS (May 07)

- FY 06 USDA (APHIS) Do No Harm Report Part 2 (Oct. 07)
- FY 07 USDA Do No Harm Report (May 08)
- FY 08 USDA Do No Harm Report (May 09) for APHIS, ARS, ERS, CSREES, ERS, NRCS & USFS.
- FY09 USDA Do No Harm Report (Feb. 10) for APHIS, ARS, ERS, NIFA, ERS, NRCS & USFS.
- FY10 USDA Do No Harm Report (March 2011) for APHIS, ARS, ERS, NIFA, ERS, NRCS & USFS.

I hereby present the FY 11 USDA Do No Harm report (dated February 2012) for APHIS, ARS, ERS, NIFA, NRCS and USFS. The document has been distributed to all ISAC members.

Copies of all the USDA reports are available online at <http://www.invasivespeciesinfo.gov/resources/orgfedusda.shtml>

3. **ISAC recommendation: NISC should request all Federal agencies to identify existing grant programs, cooperative agreements and other mechanisms that are potential sources of funds for invasive species projects.**

USDA compiled and published a comprehensive document in 2005 with grant opportunities for work on research, technical assistance or management of invasives. The document has been updated annually. The “2012 USDA Grant and Partnership Programs That Can Address Research, Technical Assistance Prevention and Control” was published November 22, 2011. ISAC members received copies. It has been distributed widely. Past reports are available at www.invasivespeciesinfo.gov

C. USDA Progress on ISAC recommendations from the October 2005 meeting

4. **ISAC recommendation: NISC policy liaisons provide guidance to ISAC Leadership and Coordination Subcommittee regarding issues the subcommittee should address.**

USDA would appreciate ISAC's support to (a) promote strengthening Federal collections, identifications and systematics efforts and capabilities; (b) promote increasing support for research (knowledge and models) and increasing the awareness of decision makers about the economic impacts of invasive species; and (c) strengthening research on invasive species and climate change.

D. USDA Progress on ISAC recommendations from the September 2006 meeting

5. ISAC recommendation: That NISC support adequate and continuing funding and staffing for classical systematics research, education and operations – including the care and maintenance of systematics collections.

Systematics clarifies the origins and movements of invasive pests, parasites and pathogens. Advances in biotechnology (including DNA sequencing, comparative genome analysis, distributed databases and high speed telecommunications) can substantially strengthen and accelerate governmental responses to these threats.

ARS funding for systematics:

FY 2008	\$20,935,632
FY 2009	\$21,189,347
FY 2010	\$21,982,411
FY 2011	\$20,135,727
FY 2012	\$19,956,277
FY 2013	\$19,937,059 (President's Proposed Budget)

Agricultural productivity depends on access to key inputs (rich soils, fertilizers, water, and energy), the inherent genetic potential of crops and livestock, and effective defenses against diseases, pests, and environmental extremes that reduce agricultural production and producer profitability. The capacity of agricultural research effectively rests on a dynamic foundation of invaluable living animal, plant, and microbial genetic resources, and research tools in the form of scientific

collections of preserved biological specimens. Such scientific collections are essential for ARS scientists to advance the science of systematics. Funding to strengthen national collections proposed in the President's FY 2011 and FY 2012 budgets was not included in the final budgets passed by Congress for those years. Initiatives to support collections were not included in the President's FY 2013 budget. A worldwide shortage of critical expertise in systematics was recognized and documented in a three-year analysis of the field. The situation report is available on the www.itap.gov Web site.

E. USDA Progress on ISAC recommendations from the May 2009 meeting

6. ISAC Recommendation: Establish the Sentinel Plant Network. Support and facilitate the establishment of the Sentinel Plant Network to facilitate the early detection reporting and prevention of pests and pathogens.

The National Plant Diagnostic Network (NPDN) and the American Public Gardens Association (APGA) received Farm Bill 2009 grant funding. This partnership made it possible to extend NPDN's diagnostic and "First Detector" training expertise to the diverse collections and public outreach programs of the more than 500 APGA member gardens across the country. The two organizations work together, with NPDN taking the lead on content development and APGA working to disseminate this information through its membership by recruiting gardens to participate in the Sentinel Plant Network, conducting training workshops for professionals, and producing educational outreach materials. To date, more than 100 public gardens in 32 states and three Canadian provinces have joined the Sentinel Plant Network.

Recently the UK Food and the Environment Research Agency hosted a meeting to discuss expanding the

Sentinel Plant Network to include gardens overseas (e.g., through the Botanic Gardens Conservation International). APGA offered to help adapt its training modules for an international audience, as information gathered offshore would inform prevention measures by monitoring North American plants exposed constantly to pests in foreign environments.

USFS Forest Health Protection program is continuing a Sentinel Trees project in China. In China, the project is focusing on existing plantings of North American tree species of interest. The existing plantings occur in botanical gardens, nurseries, and plantations. The implementation strategy for this project has 3 components; 1) looking at the grey literature for information on North American species of interest; 2) cataloging insects associated with selected host trees by trapping, chemical drenching, sweep nets or other techniques; and 3) periodic surveys of selected host trees. These projects develop techniques and procedures that we can use operationally in these and other selected countries.

7. ISAC Recommendation: Revise and draft NEPA guidance. ISAC recommends that NISC and the Council on Environmental Quality (CEQ) revise and draft guidance under the National Environmental Policy Act (NEPA), and make it available for public comment by October 1, 2009.

USDA and APHIS participated in the latest review by NISC of the proposed invasive species guidance in 2009. The NISC staff has sent the report to CEQ and is awaiting CEQ action on it.

8. ISAC Recommendation: Provide data on NISC member agencies' invasive species budgets. ISAC recommends that NISC member agencies annually provide in writing at the fall ISAC meeting their invasive species budgets for the preceding fiscal year in actual dollars and the budget for the current fiscal

year (requested and enacted). The budget document should be divided into seven categories: Prevention, EDRR, Control and Management, Restoration, Research, Education and Public Awareness, and Leadership/International Coordination.

Please see the updated budget report starting on Page 32 of this document. It contains current information up to the FY13 President's proposed budget.

F. USDA Progress on ISAC recommendations from the June 2010 meeting

9. ISAC Recommendation: That agency partners submit their annual reports according to the deadlines specified in Performance Element OC.7.1.1 of the NISC 2008-2012 National Invasive Species Management Plan, which reads: *“Each NISC member submits one formal (draft and final) report per fiscal year, tracking the implementation of the NISC 2008 Plan. NISC Staff will complete a streamlined reporting template within three months. Annual summary report by NISC is available on its website by February 28 of each year along with the individual NISC member reports.”*

All USDA agencies submitted their responses on FY09 and FY10 NISC Plan Implementation activities to NISC by the deadline for publication. The FY11 activities for USDA agencies except the USFS have been collated and submitted to NISC for integration into the 2008 National Invasive Species Management Plan accomplishment report by all NISC agencies.

10. ISAC Recommendation: That NISC adopts the Invasive Species and the Green Economy paper and recommendations within (see below).

We (ISAC) call on the member Departments and Agencies of the National Invasive Species Council (NISC) and potential partners to:

□ Establish a national survey of invasive species, to be administered at the state-level. Support this program by substantially increasing Federal and state jobs at all technical levels to survey, identify, map, catalog, and model patterns/trends of invasive plants and animals. Include the existing state and regional invasive species committees/councils in the development and implementation process. Place priority on invasive species known or projected to have substantial impacts.

APHIS assists state partners via its National Cooperative Agricultural Pest Survey Program which uses appropriated funds and with funds from Section 10201 of the Farm Bill.

The Cooperative Agricultural Pest Survey (CAPS) Pest Detection program strengthens APHIS' emergency preparedness efforts through the early detection of exotic, harmful, or economically significant plant pests, pathogens, and noxious weeds. Discovering these pests before they spread can prevent small outbreaks from becoming emergencies. APHIS and its State cooperators carry out surveys for pests of regulatory significance through the CAPS program. CAPS enable APHIS to maintain a comprehensive network of cooperators and stakeholders to facilitate its mission of safeguarding America's plant resources. In fiscal year 2011, State cooperators were provided about \$6.8 million through CAPS, and targeted 295 pests, pathogens, and noxious weeds in 130 commodity- and taxon-based surveys. A total of 18 pests and pathogens were detected (either through CAPS surveys or reported to APHIS) and recorded in an APHIS database as new or re-introduced to the United States. All of these pests were significant and listed as reportable/actionable quarantine pests. Examples include *Rhynchophorus ferrugineus* and *R. palmarum* (Red palm weevil and South American palm weevil, respectively) in California, *Planococcus minor* (Passionvine mealybug) in Florida, and *Melampsoridium hirsutikanum* (Alder rust) in California. Overall, the program detected 83.3% of the known significant introductions of plant pests or diseases before they spread from the area of original

colonization and caused significant economic or environmental damage. The program is continuing to develop commodity-based and resource-based surveys. These surveys enable the program to target high-risk hosts and commodities, gather data about pests specific to a commodity, and establish better baseline data about pests that were recently introduced in the United States.

Section 10201 of the 2008 Farm Bill directs the Secretary of Agriculture to make available \$50 million to APHIS from Commodity Credit Corporation for early plant pest detection and surveillance, for threat identification and mitigation of plant pests and diseases, and for technical assistance in the development and implementation of audit-based certification systems and nursery plant pest risk management systems. In fiscal year 2011, APHIS funded over 300 projects with hundreds of cooperators in 50 state departments of agriculture, universities, other agencies in USDA, and non-profit organizations. Over the last two years, Section 10201 projects have played a significant role in many USDA successes in protecting American agriculture and educating the public about the threat of invasive species. These successes include, among many others, the eradication of plum pox virus in Pennsylvania and Michigan (and under official control in New York), and a recent Mediterranean fruit fly outbreak in Florida, surveys for European grapevine moth in California, the 2011 national survey of honey bee pests and diseases, and the production of a documentary (“Lurking in the Trees”) to increase public awareness of the Asian long horned beetle. Section 10201 resources make the early detection and rapid response to dangerous invasive species a reality. To date, 13 separate exotic fruit fly infestations in California have been detected and eradicated without accessing CCC emergency resources. Section 10201 funding directly strengthens and protects agriculture production and protection in all 50 States. This Farm Bill provision truly supports and enhances the Federal/State partnership in safeguarding the agriculture production capacity of the United States.

US Forest Service R&D's Forest Inventory and Analysis group now includes invasive plants in their normal monitoring procedure. The list of plants included in the survey varies by region. A guide produced to help identify the 44 plants inventoried by the Northern Region, can be viewed at: <http://www.treesearch.fs.fed.us/pubs/34183>. Six FIA invasive plant state survey results were published, and can be obtained from the TreeSearch website www.treesearch.fs.fed.us. A report on the results of surveys in the Southern Region can be viewed at: <http://www.invasive.org/fiamaps/>. Custom maps can be generated using the FIDO tool at: <http://apps.fs.fed.us/fido/>. USFS Forest Health Protection program also provides states with funding for surveys of priority pests.

The USFS has been requested by USDA Office of the Inspector General to develop an inventory plan for all aquatic and terrestrial invasive species impacting the National Forest System, per the OIG recommendation in Audit Number 08601-7-AT.

□ Supplement the Federal and state workforce by creating contract jobs in the private sector and offering grants to encourage business innovation and entrepreneurship (e.g., native plant and seed companies, ecosystem restoration, invasive species mapping and control services, and education/outreach programs).

USFS-National Forest System has outlined a national approach to creating job opportunities in the private sector to detect, prevent, control, and eradicate aquatic and terrestrial invasive species across the National Forest System. This proposed approach capitalizes on the growth of the invasive species management industry and the large amount of work that was not inherently governmental. The approach also built job-creating partnerships to help raise awareness in the communities about the threat of invasive species to the national economy. State and Private Forestry matching funds for invasive plants control provide employment opportunities through state-level programs, such as cooperative weed management organizations.

□ In order to counter the dramatic decline in taxonomic capacity (i.e. the decrease in the number of people trained to identify specific species), provide grants to support

research/education/training in taxonomy as well as job creation for taxonomists and parataxonomists (people who lack formal higher-level education, but who are trained to undertake species identification tasks).

For FY2012, the following products were developed and deployed to the APHIS PPQ's programs and external partners: Trade-based digital identification resource (Table Grape Resource, Table Grape Spider ID, and Table Grape Weed Disseminule ID); Commodity-based digital identification resource (Citrus Resource, Citrus Diseases ID, and Citrus ID); Taxon-based digital identification tools (Flat Mites of the World and Tortricids of Agricultural Importance); and a major update to a portal of digital aids for plant protection and quarantine (ID Source). Job aids have been produced to support the Cooperative Agricultural Pest Survey and to identify adult and larval Khapra beetle.

□ Capitalize invasive species prevention and management needs (e.g., along roadways and on government lands) to create entry-mid level, high impact social development programs for youth and persons at risk (e.g., minimum security prison population). Establish Federal initiatives and/or offer grants to states and tribes.

NRCS district offices (one in almost every county of the U.S) work very closely with the local community in addressing natural resource issues of the area, including invasive species. Opportunities for social development at the local level also exists through the NRCS "Earth Team" volunteer program (see <http://www.nrcs.usda.gov/wps/portal/nrcs/main/?ss=16&navtype=BR&OWSEBYSUBJECT&navid=8101300000000000&pnavid=8100000000000000&ttype=main&cid=null&position=RELATEDTOPICS&pname=Volunteers%20%7C%20NRCS>).

Also, through the Conservation Innovation Grants (a program within the Environmental Quality Incentives Program (EQIP)), state or county organizations (and others) may propose social development programs as long as EQIP-eligible landowners are involved.

USFS-National Forest System is building new directives which require proactive management of invasive species in the National

Forest System, and across the broader landscape, with the goal of restoring the condition of degraded watersheds. The new manual and accompanying handbook will provide the policy foundation on which to build long lasting opportunities to engage with youth and other external workforce groups. Although funding levels have decreased, State and Private Forestry matching funds for invasive plants control provide employment opportunities through a variety of local programs, such as those administered by cooperative weed management organizations.

□ Substantially increase Federal and state agency staffing in the areas of import/border inspection for agriculture and wildlife¹⁶, specimen identification, pest risk analysis (including pre-import screening), and invasive species program management (esp. public education/outreach, regulatory enforcement, and early detection/rapid response).

DHS/Customs and Border Protection (CBP) continues to place more emphasis on agriculture pest detection. Recent training was provided to CBP Agriculture Specialists to place higher priority and increase ability to detect forest pests that are entering in wood packing material. APHIS SITC (law enforcement) continues to increase collaboration with CBP in order to do internal investigations on international cargo beyond the port environs.

New weed risk analysis methodologies have been developed and validated on over 200 known species. These methods are currently being implemented as part of a suite of risk analysis approaches designed for a major revision of the regulations for the import of propagative material and also to identify species which may be regulated as Federal Noxious Weeds.

Establishment of NAPPRA plants for planting category– In May 2011, PPQ established a new regulatory category called NAPPRA (not authorized pending pest risk analysis) for plants for planting (nursery stock) that pose a quarantine pest risk; these plants may no longer be imported unless PPQ first conducts a pest risk analysis (PRA). NAPPRA is a huge shift in plants for planting policy for the USDA. It allows PPQ to quickly take action to regulate the importation of plants that could pose a pest risk to the U.S. and then conduct a

PRA to ensure that all pest risks are addressed before the plants are brought into the country. Few plants for planting PRAs have been conducted in the past. NAPPRA makes plants for planting restrictions more similar to current requirements for fruit and vegetables. PPQ is currently preparing to add the first group of plants to the NAPPRA list.

□ Establish/strengthen internships in invasive species identification, control/eradication, mapping, and monitoring for high school and college students. Support comparable Federal, state, tribal, and non-profit initiatives.

Many ARS laboratories employ and train students at various levels of their education in current technologies used in research. In addition, ARS has numerous cooperative agreements with university scientists who employ and train students at the undergraduate and graduate level in various areas of research that utilize modern technologies applicable to solving issues related to invasive species.

USFS State and Private Forestry Program has provided support in FY 2011 to EDD Maps (see <http://www.eddmaps.org/>) internet effort for use nationwide by cooperators, including Cooperative Weed Management Associations, and students groups, for mapping and monitoring invasive plants.

USFS National Forest System units are collaborating with local landowners, state governments, NGO's and other partners to collect and record invasive species infestation data associated with populations located on National Forests and Grasslands. Invasive species inventory data (including spatial data) recorded in the USFS Natural Resource Information System (NRIS) database is being shared with external partners using a new batch-loading approach to transfer information beyond the security firewalls.

APHIS provided \$100,000, as a pilot through NIFA to offer funding for 6 week systematics internships to university students to work with systematic taxonomists of important families/classes of organisms. The needs to have a U.S. expert trained in any specific taxon were identified by APHIS. Specialists in a specific important taxon who are retired or retiring will be recruited to train one or more interns. The internships might have to go far afield, perhaps Canada

or Australia, for example, to find remaining capability. The need for expertise for taxa that are still outside of the U.S. would be identified by APHIS. Taxonomic experts outside of the US, for example in Canada, might also be contacted to receive interns.

□ Develop stronger relationships between the Federal government and green industries potentially impacted by and/or managing invasive species. For example, work with the Invasive Species Advisory Committee (ISAC) and/or NISAW to organize an Invasive Species & Green Industries Summit.

□ Mandate that, prior to receiving Federal support: 1) renewable energy projects (esp. solar, wind, and biofuel) have adequate invasive species mitigation plans in place and 2) biofuel developers/producers demonstrate that nonnative species are of low invasion risk (to the propagation site, area of potential dispersal, and along transport pathways) based on a competent invasive species risk analysis.

Any funding provided to private landowners by NRCS includes the requirement for conservation plans, a part of which is an assessment of the risk of invasive species and a plan for mitigating negative impacts from invasive species.

USFS-National Forest System is developing new policy (Forest Service Manual and accompanying Forest Service Handbook) which will require invasive species management considerations to be part of all planning and implementation of energy development and transmission programs, transportation, and other land management activities conducted on the National Forest System. The new policy will prohibit the use of invasive species for bio-fuels production on National Forests and Grasslands.

G. USDA Progress on ISAC recommendations from the December 2010 meeting

11. ISAC Recommendation: That NISC member agencies such as the Army Corps of Engineers, the Department of Agriculture (ARS and APHIS), and others, expand biological control efforts for invasive species, and in particular those in aquatic systems, which tend to have limited options that are often very costly. These efforts are justified based on economic analyses that suggest an average beneficial return of 10-17 fold for each dollar spent on biological control.

APHIS collaborated with the Army Corps of Engineers to produce and distribute aquatic biocontrol agents for Giant Salvinia, Hydrilla, and water hyacinth which eliminates the application of herbicides to navigable and environmentally sensitive waterways clogged with these invasive weeds.

Although in fiscal year 2011, APHIS did not provide additional funding to the Army Corps of Engineers for these projects, the Corps did continue the work at a reduced level.

In FY 2011, USFS published studies on biological control research for the following invasive species: yellow starthistle, scotch broom, yellow and Dalmatian toadflax, cheatgrass, and emerald ash borer.

12. ISAC Recommendation: That NISC member agencies continue to support and encourage participation in National Invasive Species Awareness Week (NISAW).

USDA, NRCS, NIFA, USFS, ARS and APHIS were active participants in the 2012 NISAW activities. We highlighted some major accomplishments in 2011: the NAPPRA rule in APHIS; USFS National Forests invasive species policy; and the global Invasive Species Compendium. USDA agencies will continue participating in NISAW in the future.

13. ISAC Recommendation: That NISC adopts the Invasive Species and the Climate Change paper (attached) and recommendations within.

Invasive Species and Climate Change

Approved by ISAC on December 9, 2010

Issue

Climate change interacts with and can often amplify the negative impacts of invasive species. These interactions are not fully appreciated or understood. They can result in threats to critical ecosystem functions on which our food system and other essential provisions and services depend as well as increase threats to human health. The Invasive Species Advisory Committee to the National Invasive Species Council recognizes the Administration's commitment to dealing proactively with global climate change. However, unless we recognize and act on the impact of climate change and its interaction with ecosystems and invasive species, we will fall further behind in our effort to prevent, eradicate and manage invasive species. We are already seeing such climate change impacts and need to act now.

Decisive Action is Required

Policy makers at all levels of government must integrate invasive species considerations into climate change policies. The strong interrelationships between climate change and the dynamic nature of invasive species, changing ecosystems, and human activities necessitate such integration. It is critical that practices be developed that strengthen environmental monitoring, management and control of invasive species to minimize impacts on the broad range of ecosystem resources upon which humans depend. The physical process of climate change interacts with the biological and physical processes of the earth's ecosystems, and these are, in turn, linked to the socio-economics of human activities.

Background

Climate change and biological invasions are dynamic, interconnected and interdependent phenomena. They affect human health and well being through their impact on resources, goods and services provided by ecosystems. These ecosystems are critical to agriculture and forests, food security, water supplies and other natural resources. They affect wildlife, recreation, and public health and safety nationwide. Even without climate change, invasive species have repeatedly and rapidly disrupted many ecosystems in the US. While climate change may have either a positive or negative effect on individual invasive species, which can be projected in various models, it is likely to have a negative effect on many specialist native species that are more restricted in their ranges. Invasive species often show higher ability to acclimate to environmental change compared to related native species. Thus, invasive species that tend to be more adaptable are expected to expand and further compromise sensitive native plant and animal communities.

The ongoing change in climate and the expected speed of this change are likely to exacerbate problems by increasing the ability of invasive species to become established, spread through, and disrupt ecosystems. At a minimum, invasive species can reshuffle the landscape for agricultural services and resources including food, fuel, feed, fiber and forests along with quickly changing land use decision pressures. As a parallel, in marine and/or aquatic ecosystems, climate change can induce fisheries collapse as mid-trophic structure species are lost opening new potential niches for tolerant invasive species. Finally, climate induced shifts in invasive disease vectors, such as those for malaria or avian flu, are of increasing concern.

Evidence indicates that climate change may alter the efficacy of management strategies for invasive species. Furthermore, changes in land cover caused by invasive plants can

influence weather and climate. In some regions, both climate change and invasive species are likely to increase the frequency of wildfires which in turn will further facilitate the establishment of fire adapted invasive species leading to even more frequent and intensive fires.

Recommendations

Policy and Legal Responsibilities

We applaud the U.S. Department of Interior's establishment of a Climate Change Response Council to synthesize data and coordinate appropriate management of our nation's lands and waters. We acknowledge the U.S. Department of Agriculture's (USDA) recent presentation of the impact of climate change in its publication: "*Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States.*" We fully support the Department of Commerce's National Oceanographic and Atmospheric Administration's (NOAA) proposal to establish the NOAA Climate Service to meet essential national needs.

Executive Order 13112 requires Federal agencies to address invasive species and establishes the National Invasive Species Council to coordinate planning and response. The International Plant Protection Convention requires analyses of pest risk. Agencies may be able to integrate climate change considerations into their existing risk-assessment protocols and procedures. Environmental laws such as the Endangered Species Act and the National Environmental Protection Act (NEPA) can be used more powerfully to address invasive species.

Opportunities for Action

We call on the member Departments and Agencies of the National Invasive Species Council and potential partners to:

ISAC Recommendation: Use the Global Change Research Act of 1990 (GCRA)48 (PL 101-606) to aggregate information about the implications of a changing climate for invasive species spread so scientific data may be synthesized through existing authorities to inform policy-makers.

ARS includes invasive species as part of its climate change research program. Invasive species research is also conducted in plant and animal production research programs. The ARS climate change research program includes synthesis activities specifically designed to inform policy-makers.

USFS Research & Development has published a synthesis of the literature on interactions of climate change and forest diseases in 2009, which can be viewed at: <http://www.treesearch.fs.fed.us/pubs/33904>. Several FS researchers co-authored a paper in the Feb 2011 special edition on Climate Change of the journal "Plant Pathology", which can be viewed at:

<http://onlinelibrary.wiley.com/doi/10.1111/j.1365-3059.2010.02406.x/abstract>

USFS Research & Development has devoted significant resources to understanding how climate change affects bark beetle life history and tree responses to attack. A synthesis paper is accessible at: <http://www.treesearch.fs.fed.us/pubs/36133>

ISAC Recommendation: Streamline and focus agency programs

to address invasive species climate interactions effectively and efficiently by establishing:

- 1) strategic plans that anticipate climate impacts on invasives,

The USDA Climate Change Science Plan includes invasives as a part of Element 1: Understand the direct and indirect effects of climate change on natural and managed ecosystems, including feedbacks to the climate system, and Element 2: Develop knowledge and tools to enable adaptation to climate change and to improve the resilience of natural and managed ecosystems. ARS includes invasives as part of its Climate Change, Soils and Emissions National Program Action Plan as part of Component 3: Enable agriculture to adapt to climate change with Problem statements of: Understand the responses of agricultural systems to anticipated climate change, and Understand the impact of anticipated climate change on endemic and exotic pests, weeds and diseases.

- 2) forward-looking environmental compliance documents (e.g., NEPA, nationwide Environmental Impact Statements on invasives prevention, management, and restoration)

ARS research projects follow the procedures described in the Code of Federal Regulations Title 7, Subtitle B, Chapter V, Part 520 for implementing the National Environmental Policy Act. These procedures assure that research and other activities of the Agricultural Research Service (ARS) comply with the intent of the National Environmental Policy Act of 1969 (NEPA) and appropriate regulations implementing this Act. These procedures incorporate and supplement, and are not a substitute for, CEQ regulations under 40 CFR parts 1500-1508, and Department of Agriculture NEPA Policies and Procedures under 7 CFR part 1b. ARS conducts and supports research as authorized by legislation to support one of the USDA

goals of assuring adequate supplies of high quality food and fiber. Information generated through such research often forms the basic data needed to assess the impact of a new technology upon the environment. Large scale projects simulating commercial practices are normally implemented in cooperation with other agencies of the Federal or State Governments.

APHIS has started to develop internal guidance for incorporating climate change into NEPA documents in order to address greenhouse gases and impacts of climate change per Executive Order 13514. APHIS also provided support for the development of the national adaptation strategy on fish, wildlife and plants under the direction of CEQ and USFWS. APHIS provided several observations and recommendations on the action of climate change as a disturbance facilitating the establishment and expansion of exotic invasive pests, pathogens and weeds.

and,

3) focus awareness programs to anticipate and manage potential climate driven ecosystem changes.

ARS conducts research on the effects of anticipated climate-driven ecosystem changes. Laboratory, plot-level, landscape, and simulation-focused research are focused on developing risk management tools to maintain the resilience of agricultural systems and the natural resources base (water, soil, air) needed to maintain production and ecosystem services.

ISAC Recommendation: Assess new climate driven invasion pathways and strengthen prevention programs to address invasives in ballast water, bio-fouling, interstate and international movement of materials and equipment (e.g., energy development, wildfire response, national defense), and screening of plant and animal imports taking account of climate impacts.

ARS conducts basic and applied research on the interacting effects of climate change on endemic and exotic pests, weeds and diseases. Resistance to management actions designed to control these types of species is being addressed. ARS is also working with APHIS to identify research needs to develop risk-management technologies based on climate events for early warning of outbreaks.

It is the goal of APHIS Veterinary Services to use climate impacts to adjust our risk-based inspection of animal and animal product imports. APHIS has assisted other countries with early warning of outbreaks (based on climate events such as El Nino), which reduces our risk of introducing pests and diseases in imports.

ISAC recommendation: Support monitoring and adaptive management programs for invasive species at the landscape scale so that natural resource managers can identify new threats and respond quickly and appropriately to invasive species in changing climatic conditions.

ARS is conducting research on remote sensing technologies to enable mapping and tracking of invasive species and the effectiveness of eradication measures.

USFS Research & Development is developing a collaborative and inclusive agency inventory, monitoring and assessment strategy (expect publication in FY 2012). This is needed to help implement the new National Forests Planning Rule.

USFS-National Forest System has expanded its corporate record keeping system and integrated survey and inventory information with treatment records to help provide critical information for adaptive management against invasive species. New USFS policy (Forest Service Manual and Forest Service Handbook) will call for the use of a structured decision making process and an adaptive resource management approach when dealing with invasive species.

ISAC Recommendation: Foster collaboration of existing networks to address the broad geographic nature and altered management of invasive species issues in a time of climate change. This will allow the national response to be coordinated, efficient, and capitalize on current capacities using a synergistic approach.

ARS and APHIS have members in FICMNEW (Federal Interagency Committee for Management of Noxious and Exotic Weeds) and ITAP (federal Interagency Committee on Invasive Terrestrial Animals and Pathogens) to inform other Federal Agencies of our research activities on invasive species and to coordinate efforts among agencies.

ARS and APHIS are having discussions about the importance of considering issues related to pests/pathogens/weeds as the USDA continues to develop its plans and responses to climate change. A joint workshop took place on April 1, 2011 with presentations and open discussion of potential collaboration between ARS and APHIS for scenario development, risk assessment, research needs and priorities, and strategies for funding.

ISAC Recommendation: Increase research and development

targeted at climate change and invasive species by supporting and expanding the USDA-ARS and US Forest Service Climate Change Programs, as well as competitive research programs such as USDA's Agricultural and Food Research Initiative, the Environmental Protection Agency's Project Grants, NSF's Conservation and Biology program, and NOAA's Sea Grant program. Better understanding of the interaction of climate change and invasive species will result in more relevant prioritization and management on the ground. This includes recognizing the economic basis for invasive species management decisions and supporting work that integrates economic, ecological and biological data providing policy and management support.

ARS is currently examining its portfolio of research projects relevant to climate change and invasive species. The goal is to expand an informal working group of ARS scientists focused on climate change and invasive species for the purposes of increasing opportunities for collaboration.

NIFA offered a new AFRI Challenge Area Grant Program in FY2011 entitled "Climate Change". This AFRI Challenge Area focuses on the priority to mitigate and adapt to climate change. It supports activities that reduce greenhouse gas emissions, increase carbon sequestration in agricultural and forest production systems, and prepares the nation's agriculture and forests to adapt to changing climates. The long-term outcome for this program is to reduce the use of energy, nitrogen fertilizer, and water by ten percent and increase carbon sequestration by fifteen percent through resilient agriculture and forest production systems under changing climates. In order to achieve this outcome, this program is supporting single-function Research, Education, and Extension Projects, multi-function Integrated Research, Education, and/or Extension Projects, and Food and Agricultural Science Enhancement (FASE) projects that address one of the Program Area Priorities. **NIFA, through the AFRI**

Agricultural Science for Climate Variability and Change Challenge Area Program is offering two competitive grant programs addressing climate change in 2012. These programs include: [Integrated Approaches to Climate Adaptation and Mitigation in Agroecosystems; and Regional Approaches for Adaptation to and Mitigation of Climate Variability and Change.](#)

Congress cut USFS Climate change research program in FY 2012 by 10%.

ISAC recommendation: Use climate matching and ecological niche models to prioritize management of species that are most likely to cause the greatest harm in the future as a result of climate change. This will require the Federal response to be coordinated, empowered, and appropriately funded.

ARS responds to priorities for research gathered from customer-stakeholder workshops, science collaborators and Federally-mandated priorities.

NRCS has historically been a key source of this information for ARS. NRCS with its partners are developing tools to estimate the amount of carbon stored and GHG emissions reduced at the field and producer level. [COMET-VR](#) is a web-based, interactive decision support tool that includes the effects of land-management changes and is authorized for voluntary GHG reporting under section 1605(b) of the 1992 Energy Policy Act. It is a cooperative effort between NRCS and Colorado State University. Tools like COMET-VR make it easier for producers to estimate carbon storage and GHG emissions reductions for their entire holdings. The market for carbon credits trading in the form of carbon emissions reduction is in its formative stages and agricultural producers stand to benefit. NRCS has also instituted an Environmental Credit Trading Information Series to answer basic questions in environmental trading. The first document in the series discusses [Carbon Credit Trading on Rangeland.](#)

ARS is currently in dialogue with APHIS concerning priorities for research and development of relevant technologies.

H. USDA Progress on ISAC recommendations from the June 2011 meeting

14. ISAC Recommendation: To enhance the effectiveness of biological control programs at their inception, ISAC recommends that NISC Departments and Agencies working on biological control of invasive organisms, plan, conduct, and evaluate their programs in the context of an Integrated Pest Management (IPM) approach. This may require integrating biological control in concert with other management options (i.e., physical, cultural, and chemical) to achieve maximum effectiveness. For example, many invasive species are susceptible to both biological control agents and competitive interactions. As a result, using these approaches in concert can provide synergy towards achieving the desired land management objectives. ISAC has previously recommended an IPM approach to invasive management strategies. While most biological control efforts often consider themselves a stand-alone, silver bullet solution, a more integrated approach should increase the probability of success. *This recommendation addresses the National Invasive Species Management Plan, Implementation Task CM.1.2:*

Identify and address strategic gaps in regional invasive species control and management efforts and tools.

In support of the Department's Integrated Pest Management (IPM) goals and other IPM needs, ARS currently conducts more than 144 IPM research projects at 56 locations that are focused on minimizing pesticide inputs through the development of classical and augmentation biological control, cultural control, host-plant resistance, behavior modifying chemicals (e.g., pheromone mating disruptors and attracticides), sterile insect release techniques, resistance management, cultural and mechanical practices, improved pesticide application technologies, and other related pest control tactics. Target pests include a multitude of insects, mites, and ticks; plant pathogens and nematodes; and weeds.

In addition, ARS funds the Areawide Pest Management Program, which supports 5 to 10 multi-year IPM projects to facilitate the implementation and adoption of ARS-developed IPM technologies to control or suppress agricultural pests over multi-state or multi-

regional areas through partnerships with growers, commodity groups, and State institutions, Federal and State agencies, and the private sector. Past Areawide projects have supported the suppression of economically important pests such as codling moth in the Pacific Northwest, corn rootworm in the Midwest, leafy spurge in the Northern Plains, stored grain insects in the Midwest, tephritid fruit flies in the Hawaiian islands, fire ants in the Southern U.S., Russian wheat aphid and greenbug in the Great Plains, tarnished plant bug in Louisiana and Mississippi, and *Melaleuca* in the Florida everglades.

Current Areawide projects include:

- Methyl Bromide Alternatives for fruit and nut production in California and Florida (2007-2011);
- Weedy annual grasses on rangelands, such as cheatgrass (*Bromus tectorum*) and medusahead (*Taeniatherum caput-medusae*), in the Great Basin ecosystem of the United States (2008-2012);
- The Asian tiger mosquito (*Aedes albopictus*) and West Nile virus, with initial demonstration sites located in New Jersey (2008-2012);
- The navel orangeworm (*Amyelois transitella*) attacking almonds, pistachios, and walnuts in California (2008-2012); and
- Honey bee health, survival, and pollination availability across the United States by controlling bacterial, protozoan, fungal, and viral pathogens of honey bees, as well as *Varroa* and *Acarapis* bee mites (2008-2012).

Other related projects that contribute to the overall ARS IPM program include: a; community based areawide pest management of silverleaf whitefly across the southern tier of the United States; and an IPM program that has significantly lowered glassy-winged sharpshooter/Pierce's disease in California vineyards.

NRCS is an advocate for the use of integrated pest management, and encourages the use of methods that will successfully address the pest problem with the least negative impact upon the natural resources and the environment. Discussions by members of the State Technical Committee in each state set priorities and methods of addressing natural resource issues, including invasive species. NRCS offices across the nation are also active members of a number

of Cooperative Weed Management Areas that address invasive species from a regional perspective.

APHIS develops and applies biological control agents as part of an overall pest management program. There are areas infested with invasive plant pests that may not be treated with conventional pesticides or other cultural practices due to environmental sensitivity or public concern. Biological control may offer the only sustainable solution in these areas. For example, APHIS is partnering with ARS to evaluate natural enemies of the brown marmorated stink bug. Because of the broad host range of this pest, it is not possible to develop an integrated area-wide management program without incorporating biological control with other control methods. The natural enemies may become established in residential and natural areas while agricultural production areas may require the use of other control tactics to maintain the pest below economically damaging levels.

15. ISAC Recommendation: To further enhance the potential effectiveness of biological control programs, ISAC recommends federal land management agencies that oversee and conduct control operations utilizing biological control agents become more fully engaged in adaptive management by collecting and sharing post-release monitoring data. This Integrated Pest Management (IPM) approach should emphasize partnerships with local controlling authorities, post-release monitoring and collaborative programs with land managers and other federal, state and university scientists in other pest management disciplines to develop principles and technical guidance and recommendations for invasive species management. As examples, such efforts have already been established by Team Leafy Spurge and the areawide melaleuca project.

This recommendation addresses the National Invasive Species Management Plan, Implementation Task CM.4.1:

Enhance ecosystem recovery decision tools and conduct ecosystem assessments.

NRCS includes, as a requirement in the conservation plans developed with private land-owners, monitoring the results of

integrated pest management efforts in order to determine the performance of various IPM methods. Lessons learned from this monitoring assists NRCS in improving the technical assistance it provides to private landowners in addressing their specific invasive species issues.

USFS-National Forest System is developing new policy (Forest Service Manual and Forest Service Handbook) to provide standards, criteria, requirements and other guidance related to the management of invasive species using an integrated pest management approach. Proper record keeping on treatments and treatment efficacy will be part of the new Handbook, and will include guidance on using an adaptive resource management approach and promoting the sharing of treatment information with partners when applicable.

16. ISAC Recommendation: In accordance with the National Environmental Policy Act (NEPA), ISAC recommends that NISC Departments, Agencies and their contractors assess the risk of invasiveness whenever their activities lead to the introduction of [non-native] species or their subsets (i.e. moving organisms from where they occur to where they have never occurred historically).

ARS research projects follow the procedures described in the Code of Federal Regulations Title 7, Subtitle B, Chapter V, Part 520 for implementing the National Environmental Policy Act. These procedures assure that research and other activities of the Agricultural Research Service (ARS) comply with the intent of the National Environmental Policy Act of 1969 (NEPA) and appropriate regulations implementing this Act. These procedures incorporate and supplement, and are not a substitute for, CEQ regulations under 40 CFR parts 1500-1508, and Department of Agriculture NEPA Policies and Procedures under 7 CFR part 1b. ARS conducts and supports research as authorized by legislation to support one of the USDA goals of assuring adequate supplies of high quality food and fiber. Information generated through such research often forms the basic data needed to assess the impact of a new technology upon the environment. Large scale projects simulating commercial practices are normally implemented in cooperation with other agencies of the Federal or State Governments.

NRCS response: Climate change is requiring us to re-think our definition of, and preference for “native species.” Some plants considered to be “native” to specific locations may, due to climate changes, no longer be able to survive, or may become invasive. NRCS always assesses the risk of invasiveness when restoring areas, but, due to climate changes, we, and our partners in restoration, must now consider the viability and impacts of plants whether they are historically considered to be “native” or “invasive” to the specific location and climate.

USFS-National Forest System is developing new policy (Forest Service Manual and Forest Service Handbook) which will include requirements, standards, criteria, and other guidance on the use of standardized contract language and restrictions to prevent and control invasive species on the National Forest System, including during activities conducted by permittees, contractors, and other cooperators.

I. **USDA Progress on ISAC recommendations from the December 2011 meeting**

17. ISAC Recommendation: ISAC recommends that NISC support and encourage the National Research Council of the National Academy of Sciences review of frameworks for the validation of advanced molecular assays for aquatic invasive species detection technologies and their protocols.

18. ISAC Recommendation: Expanding trade across the Pacific poses a dual challenge to the control of invasive species. First, there is a high potential for introductions of new species in both directions. Second, there is a high potential that some introduced species will become invasive because of similarities between the climates and ecology of central and eastern Asia and North America. In light of these challenges and the potential negative impacts of the introduction of invasive species in either direction across the Pacific on the economies and environment of the U.S. and its trading partners in eastern Asia, ISAC recommends that the Department of State seek the cooperation of appropriate agencies in convening a multilateral meeting of scientists and governmental representatives

from APEC countries to develop measures to prevent the introduction of invasive species in the course of transpacific commerce.

APHIS, USFS and ARS would participate in such a meeting when invited by the US Department of State and China.

19. ISAC Recommendation: Please prepare a **special report on the budget impacts to invasive species programs** for the ISAC Spring 2012 meeting.

Budget table for USDA programs on invasive species:

Funding Available for Invasive Species General Categories

Departmental Template - USDA

Dollars in Thousands

USDA	Agency	FY 2010 Actual	FY 2011 Actual	FY 2012 Enacted	FY 2013 Budget
Prevention	APHIS b/	\$ 113,552	\$ 102,562	\$ 106,223	\$ 101,056
Prevention	ARS	\$ 5,691	\$ 5,440	\$ 5,518	\$ 5,518
Prevention	NIFA	\$ 3,123	\$ 2,241	\$ 2,242	\$ 2,164
Prevention	ERS	\$ -	\$ -	\$ -	\$ -
Prevention	USFS	\$ 38,218	\$ 37,103	\$ 26,103	\$ 26,273
Prevention	NRCS	\$ 8,655	\$ 8,448	\$ 9,437	\$ 9,637
Prevention Total		\$ 169,239	\$ 155,794	\$ 149,523	\$ 144,648
Early Detection & Rapid Response	APHIS	\$ 255,646	\$ 221,419	\$ 224,154	\$ 210,607
Early Detection & Rapid Response	ARS	\$ 8,087	\$ 7,838	\$ 5,933	\$ 5,905
Early Detection & Rapid Response	NIFA	\$ 5,860	\$ 4,278	\$ 4,278	\$ 4,146
Early Detection & Rapid Response	ERS	\$ -	\$ -	\$ -	\$ -
Early Detection & Rapid Response	USFS c/	\$ 700	\$ 590	\$ 9,500	\$ 9,320
Early Detection & Rapid Response	NRCS	\$ 8,655	\$ 8,448	\$ 9,437	\$ 9,637
Early Detection & Rapid Response Total		\$ 278,948	\$ 242,573	\$ 253,302	\$ 239,615
Control	APHIS	\$ 288,579	\$ 280,143	\$ 248,356	\$ 238,368
Control	ARS	\$ 100,264	\$ 94,752	\$ 81,895	\$ 78,179
Control	NIFA d/	\$ 13,997	\$ 10,536	\$ 10,551	\$ 10,328
Control	ERS	\$ -	\$ -	\$ -	\$ -
Control	USFS	\$ 42,664	\$ 49,902	\$ 44,257	\$ 44,174
Control	NRCS	\$ 86,549	\$ 84,484	\$ 94,367	\$ 96,371
Control Total		\$ 532,053	\$ 519,817	\$ 479,426	\$ 467,420

		FY 2010 Actual	FY 2011 Actual	FY 2012 Enacted	FY 2013 Budget
Research	APHIS	\$ 54,546	\$ 56,481	\$ 60,738	\$ 58,368
Research	ARS	\$ 124,888	\$ 122,166	\$ 117,153	\$ 116,532
Research	NIFA	\$ 18,370	\$ 13,832	\$ 13,857	\$ 13,570
Research	ERS a/	\$ 1,000	\$ 1,000	\$ 835	\$ 835
Research	USFS	\$ 37,463	\$ 36,004	\$ 35,800	\$ 33,346
Research	NRCS	\$ -	\$ -	\$ -	\$ -
Research Total		\$ 236,267	\$ 229,483	\$ 228,383	\$ 222,651
Restoration	APHIS	\$ -	\$ -	\$ -	\$ -
Restoration	ARS	\$ 296	\$ 353	\$ 442	\$ 442
Restoration	NIFA	\$ 2,416	\$ 1,808	\$ 1,810	\$ 1,769
Restoration	ERS	\$ -	\$ -	\$ -	\$ -
Restoration	USFS	\$ 7,222	\$ 7,580	\$ 7,338	\$ 6,244
Restoration	NRCS	\$ 25,964	\$ 25,345	\$ 28,310	\$ 28,911
Restoration Total		\$ 35,898	\$ 35,086	\$ 37,900	\$ 37,366
Ed & Public Awareness	APHIS	\$ -	\$ -	\$ -	\$ -
Ed & Public Awareness	ARS	\$ 46,356	\$ 44,342	\$ 39,058	\$ 37,727
Ed & Public Awareness	NIFA	\$ 4,111	\$ 2,996	\$ 2,982	\$ 2,873
Ed & Public Awareness	ERS	\$ -	\$ -	\$ -	\$ -
Ed & Public Awareness	USFS	\$ -			
Ed & Public Awareness	NRCS	\$ 43,275	\$ 42,242	\$ 47,183	\$ 48,186
Ed & Public Awareness Total		\$ 93,742	\$ 89,580	\$ 89,223	\$ 88,786
Leadership/Intl. Cooperation	APHIS	\$ 56,979	\$ 56,194	\$ 47,313	\$ 46,910
Leadership/Intl. Cooperation	ARS	\$ -	\$ -	\$ -	\$ -
Leadership/Intl. Cooperation	NIFA	\$ 3,405	\$ 2,520	\$ 2,511	\$ 2,433
Leadership/Intl. Cooperation	ERS	\$ -	\$ -	\$ -	\$ -
Leadership/Intl. Cooperation	FS	\$ 180	\$ 315	\$ 242	\$ 242
Leadership/Intl. Cooperation	NRCS	\$ -	\$ -	\$ -	\$ -
Leadership/Intl. Cooperation Total		\$ 60,564	\$ 59,029	\$ 50,066	\$ 49,585
		FY 2010 Actual	FY 2011 Actual	FY 2012 Enacted	FY 2013 Budget
Agriculture Department Total		\$1,406,711	\$ 1,331,362	\$ 1,287,823	\$ 1,250,071

- a/ ERS contributes to the USDA's invasive species efforts through the pesticide use and pesticide management systems economic research and analysis program, which contributes to Integrated Pest Management (IPM), Food Quality Protection Act implementation, invasive species and the areawide IPM programs.
- b/ APHIS figures for 2012 Enacted and 2013 Budget are estimated obligations, including prior year funding. FY 2010 actuals have been restated due to implementation of new budget structure, reporting and data analysis capacities.
- c/ Forest Service data now captures Eradication and Rapid Response expenditures, based on refinement of the workplace database tracking systems for invasives species work
- d/ NIFA expenditures are impacted and vary from year to year due to the availability of grant funding.

		FY 2010	FY 2011	FY 2012	FY 2013
	AGENCY	Actual	Actual	Enacted	Budget
AGENCY TOTAL BUDGETS	APHIS	\$ 769,302	\$ 716,799	\$ 686,784	\$ 655,309
	ARS	\$ 285,582	\$ 274,891	\$ 249,999	\$ 244,303
	NIFA	\$ 51,282	\$ 38,211	\$ 38,231	\$ 37,283
	ERS	\$ 1,000	\$ 1,000	\$ 835	\$ 835
	USFS	\$ 126,447	\$ 131,494	\$ 123,240	\$ 119,599
	NRCS	\$ 173,098	\$ 168,967	\$ 188,734	\$ 192,742

APHIS Examples of Budget Impacts on Invasive Species Activities

APHIS in FY 2010

- In FY10, APHIS' total appropriation was approximately \$909 million, an increase of nearly \$28 million over the FY09 level.
- In FY10, APHIS received funding increases for programs that target invasive species, such as the Asian long-horned beetle (+ \$13 million for a total of \$33 million), emerald ash borer (+ \$2.5 million for a total of \$37.2 million), a variety of citrus pests and diseases (+ \$8.9 million for a total of \$44.6 million), and cattle fever ticks (+ \$3 million for a total of \$13.2 million).

APHIS in FY 2011

- In FY11, APHIS' total appropriation was nearly \$867 million.
- Congress removed all earmarked funding (a total of about \$27 million) from APHIS' budget in FY11.
- Some of the earmarks supported invasive species programs, such as efforts to prevent the introduction of the brown tree snake into Hawaii and to control it on Guam.

APHIS in FY 2012

- APHIS' FY12 appropriation is \$819.7 million, a decrease of more than \$47 million from the FY11 funding level.
- Even with the overall decrease in funding, APHIS received increases to target several invasive species, including \$7

million for the Asian long-horned beetle (ALB) (for a total of about \$40 million), \$9 million for the light brown apple moth (for a total of about \$10 million) and \$2.5 million (in total) for the European grapevine moth, both pests that damage fruit production in California.

- APHIS moved to a new budget structure that aligns funding with the commodity or resource group it protects, rather than specific pests or diseases. Examples of the new line items include Tree and Wood Pests and Cattle Health. This new structure will give APHIS flexibility to address new threats as they emerge. APHIS is using this new flexibility to devote additional funding (beyond the increase mentioned above) to ALB eradication in FY12.
- In the FY12 budget, APHIS proposed a change in its strategy and funding level for the emerald ash borer because of lack of practical control tools for the pest and received a corresponding decrease in funding of approximately \$24 million (from \$37 million to \$13 million).

APHIS in FY 2013 President's Proposed Budget

- The President's Budget proposes \$765 million in FY13, a decrease of \$54 million from the FY12 funding level.
- The budget request includes a variety of decreases, some related to efficiencies and process improvements that will allow APHIS to continue providing the same level of services but at a lower cost. In other cases, APHIS proposes to eliminate or scale back the Federal role in pest or disease programs because the particular pest or disease has become too widespread. Two invasive species programs fall into this category, including Tree and Wood Pests (where APHIS is proposing to further scale back its emerald ash borer (EAB) effort to focus on outreach and biological control initiatives) and Equine and Cervid Health (where APHIS is proposing to eliminate federal funding for chronic wasting disease).

Economic Research Service Invasive Species Activities
Program of Research on the Economics of Invasive Species
Management (PREISM): Extramural and Intramural Research

- Since FY03, \$7.5 million funded 53 extramural research projects.
- PREISM resulted in over 100 journal articles and book chapters, numerous conference papers, and close to 20 doctoral dissertations and Master's theses.
- Recipients presented results to APHIS and other Federal and State agencies; several participated in the National Academy review of the light brown apple moth program.
- ERS intramural research addressed soybean rust, integration of prevention and control strategies, and approaches to pest exclusion.
- Eight PREISM Workshops (FY03 to FY11) discussed economics of invasive species and presented results.

ERS Program Impacts Based on Reduced Funding

- ERS reduced funding to new extramural projects on the economics of invasive species management through PREISM, but continues to emphasize intramural research and the annual PREISM workshops.
- In FY12 and FY13, ERS' research supports intramural economic analysis of invasive species management, which addresses USDA program and policy issues, especially with respect to climate change.

ARS Examples of Budget Impacts on Invasive Species Activities

ARS Invasive Species Research FY10-13

Please see budget table above.

ARS Systematics Funding:

FY10 \$21,982 K

FY11 \$20,36 K

FY12 \$19,956 K

Proposed FY13 \$19,937 K

ARS Scientist Years (as a Percentage of FY 2009)

<u>Fiscal Year</u>	<u>All projects</u>	<u>Invasive Species projects</u>
FY09 (actual)	2,152 scientist yrs	349 scientist yrs
FY10	2,130 scientist yrs	341 scientist yrs
FY11	2,113 scientist yrs	340 scientist yrs
FY12	1,990 scientist yrs	292 scientist yrs (of these, lost 20 classic entomologist scientist positions)
FY 13		Lose 4 classical entomologist scientist positions

NIFA Examples of Budget Impacts on Invasive Species Activities

NIFA in FY 2010

- NIFA's Biology of Weedy and Invasive Species in Agroecosystems Program was discontinued in AFRI in FY10, which eliminated approximately \$4 million in invasive species funding and work.

NIFA in FY 2011

- NIFA's Crops at Risk (CAR), Risk Avoidance and Mitigation Program (RAMP), and Critical Issues Programs were eliminated in FY11. These programs funded approximately \$6 million worth of projects on invasive arthropods, weeds and plant diseases, often on a landscape or area-wide scale.
- From FY00 to FY11, IPM funding from NIFA has been cut by 36% (source: IPM Voice).

NIFA in FY 2012

- NIFA's Crops at Risk (CAR), Risk Avoidance and Mitigation Program (RAMP), and Critical Issues Programs were again eliminated in FY12.

NIFA in FY 2013 President's Proposed Budget

- Proposed Crop Protection Program for NIFA would consolidate six (6) IPM-related funding lines into a \$29 million program to improve coordination and enhance NIFA's ability to support research, education and extension activities needed to ensure global food security and respond to other societal challenges (e.g., impacts from invasive species).

NRCS Examples of Budget Impacts on Invasive Species Activities

NRCS in FY 2010

- Use of FY10 funds by NRCS State offices to address invasive species indicate a slight increase over funds used in FY09.
- There were no Conservation Innovation Grant funds awarded to proposals addressing invasive species issues.

NRCS in FY 2011

- Use of FY11 funds by NRCS State offices to address invasive species indicate some increase over funds used in FY10.
- There were no Conservation Innovation Grant funds awarded to proposals addressing invasive species issues.

NRCS in FY 2012

- Use of FY11 funds by NRCS State offices to address invasive species indicate some increase over funds used in FY10.
- There were no Conservation Innovation Grant funds awarded to proposals addressing invasive species issues.

NRCS in FY 2013 President's Proposed Budget

- Funds used by the NRCS State offices to address invasive species in FY13 are anticipated to be a slight increase over the funds that will be used in FY12.
- We do not know, at this point, if invasive species will be a focus area for the 2013 Conservation Innovation Grants.

USFS Examples of Budget Impacts on Invasive Species Activities

USFS in FY 2010

- 13% reduction in Sudden Oak Death research (\$2.4M).
- Funding integration and growth resulted in USFS National Forest System invasive species management activities advancing in FY10, resulting in 419,598 acres of priority infestations treated spanning multiple taxa of aquatic and terrestrial, invasive species.

- In FY10, National Forests and Grasslands restored 318,591 acres against invasive species through a national average restoration outcome of 78.6%.

USFS in FY 2011

- 5% decrease in Forest Service research budget and loss of 4% research capability on invasive species (Gypsy Moth, Emerald Ash Borer, Hemlock Woolly Adelgid, Gold Spotted Oak Borer, Laurel Wilt, Beech Bark Disease, Butternut Canker, Invasive Plants).
- 67% reduction in Sudden Oak Death research (\$2.1M).
- Agency-wide Travel Constraint: Travel to professional meetings and funding to partners reduced.
- Funding integration and growth in FY11 resulted in National Forest System invasive species management activities achieving 352,091 acres of priority infestations treated on multiple taxa of aquatic and terrestrial invasive species.
- The focus on high priority infestations resulted in a higher average unit cost per acre for many treatments against high risk species.
- In FY11, National Forests and Grasslands restored 265,751 acres against invasive species through a national average restoration outcome of 75.2%.

USFS in FY 2012

- 5% decrease in Forest Service research budget and loss of 0.5% research capability on invasive species (Emerald Ash Borer, Asian Longhorned Beetle, Hemlock Woolly Adelgid, Gypsy Moth, Gold Spotted Oak Borer, Thousand Canker Disease, Laurel Wilt, Beech Bark Disease, Oak Wilt, Butternut Canker, Invasive Plants, Terrestrial and Aquatic Invasives).
- 95% reduction in Sudden Oak Death research (\$100K).
- Elimination of lower priority lines of invasive research and funding to partners.
- Agency-wide Travel Constraint: Limited travel to professional meetings and for field work.
- In FY12, National Forest System restructured its budget around Integrated Resource Restoration, targeting restoring and improving watershed condition through a variety of integrated

- activities, including management of aquatic and terrestrial invasive species on national forests and grasslands.
- FY12 expenditures for integrated invasive species management activities (including prevention, early detection and rapid response, control) were estimated at \$55 million for the National Forest System.
 - As per new policy (FSM 2900), the focus on high priority infestations will likely result in a higher average unit cost per acre for many treatments against high risk species.

USFS in FY 2013 President's Proposed Budget

- 5% decrease in Forest Service research budget and loss of 7% research capability on invasive species (Emerald Ash Borer, Asian Longhorned Beetle, Hemlock Woolly Adelgid, Gypsy Moth, Gold Spotted Oak Borer, Thousand Canker Disease, Laurel Wilt, Beech Bark Disease, Oak Wilt, Butternut Canker, Invasive Plants, Terrestrial and Aquatic Invasives).
- 98% reduction in Sudden Oak Death research (\$75K).
- Loss of insect rearing facility in California.
- Elimination of lower priority lines of invasive research and funding to partners.
- Agency-wide Travel Constraint: Limited travel to professional meetings and for field work.

I respectfully submit this report to ISAC. If you have any questions, do not hesitate to contact me. Thank you.

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